



ITGB2 gene

integrin subunit beta 2

Normal Function

The *ITGB2* gene provides instructions for making one part (the $\beta 2$ subunit) of at least four different proteins known as $\beta 2$ integrins. The other subunit can be one of a variety of alpha (α) subunits that are produced from different genes. Integrins are a group of proteins that regulate the attachment of cells to one another (cell-cell adhesion) and to the surrounding network of proteins and other molecules (cell-matrix adhesion). Integrins also transmit signals that regulate cell growth and the activity of certain genes.

Integrins that contain the $\beta 2$ subunit are found embedded in the membrane that surrounds white blood cells (leukocytes). $\beta 2$ integrins help leukocytes gather at sites of infection or injury, where they are needed to contribute to the immune response. $\beta 2$ integrins recognize signs of inflammation and attach (bind) to proteins called ligands on the lining of blood vessels. This binding leads to linkage (adhesion) of the leukocyte to the blood vessel wall. Signaling through the $\beta 2$ integrins triggers the transport of the attached leukocyte across the blood vessel wall to the site of infection or injury.

Health Conditions Related to Genetic Changes

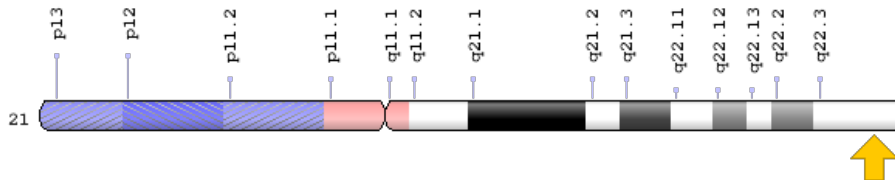
leukocyte adhesion deficiency type 1

At least 90 mutations in the *ITGB2* gene have been found to cause leukocyte adhesion deficiency type 1. This condition is characterized by severe, recurrent infections and delayed healing after injury. Many of the mutations that cause this condition change single protein building blocks (amino acids) in the $\beta 2$ subunit and lead to the production of a $\beta 2$ subunit that cannot bind with other subunits to form integrins. Rarely, defective $\beta 2$ subunits are able to form integrins, but the integrins cannot bind ligands. Leukocytes that lack these integrins cannot attach to the blood vessel wall or cross the vessel wall to contribute to the immune response. As a result, there is a decreased response to injury and foreign invaders, such as bacteria and fungi, resulting in frequent infections, delayed wound healing, and other signs and symptoms of leukocyte adhesion deficiency type 1.

Chromosomal Location

Cytogenetic Location: 21q22.3, which is the long (q) arm of chromosome 21 at position 22.3

Molecular Location: base pairs 44,885,949 to 44,928,873 on chromosome 21 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- CD11b/ CD18
- CD11c/CD18
- CD11d/CD18
- CD18
- complement receptor C3 beta-subunit
- complement receptor C3 subunit beta
- CR3
- integrin beta-2
- integrin beta 2
- integrin beta chain, beta 2
- integrin, beta 2 (complement component 3 receptor 3 and 4 subunit)
- LFA-1 (α L β 2)
- Mac-1 (α M β 2)
- p150/95 (α X β 2)
- α D β 2

Additional Information & Resources

Educational Resources

- Molecular Biology of the Cell (fourth edition, 2002): Integrins
<https://www.ncbi.nlm.nih.gov/books/NBK26867/>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28ITGB2%5BTIAB%5D%29+OR+%28integrin+beta+2%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+%english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1800+days%22%5Bdp%5D>

OMIM

- INTEGRIN, BETA-2
<http://omim.org/entry/600065>

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
http://atlasgeneticsoncology.org/Genes/GC_ITGB2.html
- ClinVar
<https://www.ncbi.nlm.nih.gov/clinvar?term=ITGB2%5Bgene%5D>
- HGNC Gene Family: CD molecules
<http://www.genenames.org/cgi-bin/genefamilies/set/471>
- HGNC Gene Family: Complement system
<http://www.genenames.org/cgi-bin/genefamilies/set/492>
- HGNC Gene Family: Integrin beta subunits
<http://www.genenames.org/cgi-bin/genefamilies/set/1159>
- HGNC Gene Symbol Report
http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=6155
- NCBI Gene
<https://www.ncbi.nlm.nih.gov/gene/3689>
- UniProt
<http://www.uniprot.org/uniprot/P05107>

Sources for This Summary

- OMIM: INTEGRIN, BETA-2
<http://omim.org/entry/600065>
- Parvaneh N, Mamishi S, Rezaei A, Rezaei N, Tamizifar B, Parvaneh L, Sherkat R, Ghalehbaghi B, Kashef S, Chavoshzadeh Z, Isaeian A, Ashrafi F, Aghamohammadi A. Characterization of 11 new cases of leukocyte adhesion deficiency type 1 with seven novel mutations in the ITGB2 gene. J Clin Immunol. 2010 Sep;30(5):756-60. doi: 10.1007/s10875-010-9433-2. Epub 2010 Jun 12.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/20549317>
- Schmidt S, Moser M, Sperandio M. The molecular basis of leukocyte recruitment and its deficiencies. Mol Immunol. 2013 Aug;55(1):49-58. doi: 10.1016/j.molimm.2012.11.006. Epub 2012 Dec 17. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/23253941>
- van de Vijver E, Maddalena A, Sanal Ö, Holland SM, Uzel G, Madkaikar M, de Boer M, van Leeuwen K, Köker MY, Parvaneh N, Fischer A, Law SK, Klein N, Tezcan FI, Unal E, Patisroglu T, Belohradsky BH, Schwartz K, Somech R, Kuijpers TW, Roos D. Hematologically important mutations: leukocyte adhesion deficiency (first update). Blood Cells Mol Dis. 2012 Jan 15;48(1):53-61. doi: 10.1016/j.bcmd.2011.10.004. Epub 2011 Nov 30. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/22134107>
Free article on PubMed Central: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4539347/>

Reprinted from Genetics Home Reference:

<https://ghr.nlm.nih.gov/gene/ITGB2>

Reviewed: April 2014

Published: March 21, 2017

Lister Hill National Center for Biomedical Communications

U.S. National Library of Medicine

National Institutes of Health

Department of Health & Human Services